Candidate Name	Centre Number	Candidate Number
		2

WJEC CBAC

GCE AS/A level

312/01

BIOLOGY – BI2

A.M. THURSDAY, 8 January 2009

1½ hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**4**	
2.	**9**	
3.	**6**	
4.	**13**	
5.	**15**	
6.	**13**	
7.	**10**	
TOTAL	**70**	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. *(a)* Name **two** ways in which attempts are made to regulate overfishing. [2]

1. .....

2. .....

(b) What do ecologists mean by the term *carrying capacity*? [1]

.....

(c) What process, in a plant, is explained by the cohesion-tension theory? [1]

.....

(Total 4 marks)

2. *(a)* Tick (✓) the appropriate box (or boxes) to indicate the human blood vessels to which each statement applies.

Statement	*Arteries*	*Capillaries*	*Veins*
Regular fluctuations in blood pressure			
Low blood pressure			
Contains a smooth endothelium			
Possess valves throughout their length			
Contains numerous elastic fibres			

[5]

(b) Describe the mechanism by which materials

(i) pass from the capillaries into the tissue fluid; [2]

.....

.....

.....

(ii) pass from the tissue fluid into the capillaries. [2]

.....

.....

.....

(Total 9 marks)

3. Explain the role of each of the following in the opening mechanism of the stomata.

(a) (i) Potassium ions. [2]

.....

.....

(ii) The thickness of guard cell walls. [2]

.....

.....

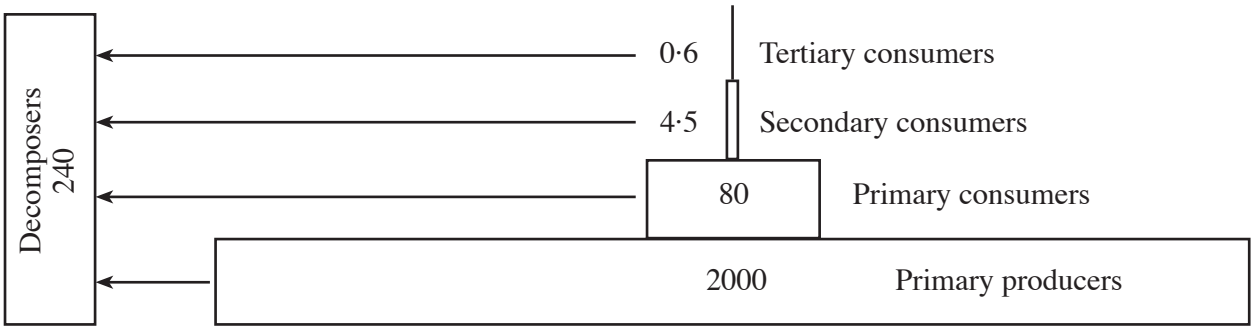
(b) State **two** environmental factors that affect the opening and closing of stomata. [2]

.....

.....

(Total 6 marks)

4. The diagram below shows a pyramid of energy for a tropical forest. The amount of energy entering at each stage is shown in $kJm^{-2}y^{-1} \times 10^2$.



(a) Use the information in the diagram to explain why food chains rarely contain more than four or five trophic levels. [1]

.....

.....

(b) The tertiary consumers include hawks which feed on other birds. Draw a food chain in the space below to show how energy from the leaves of the primary producer reaches the hawk. [1]

(c) The primary consumers lose 50 $kJm^{-2}y^{-1} \times 10^2$ of their energy through respiration.

(i) What percentage of the remaining energy of the primary consumers is taken up by secondary consumers? (Show your working.) [3]

.....

.....

.....

(ii) Explain what has happened to the rest of the primary consumers' energy. [2]

.....

.....

(d) List the **two** trophic levels that are likely to have the greatest effects on atmospheric CO_2 levels and hence on global warming. Explain your choices. [4]

Level .....

Explanation .....

.....

Level .....

Explanation .....

.....

(e) Apart from disruption of the food chains, give **two** *other* effects that deforestation might have on the primary and secondary consumer populations. [2]

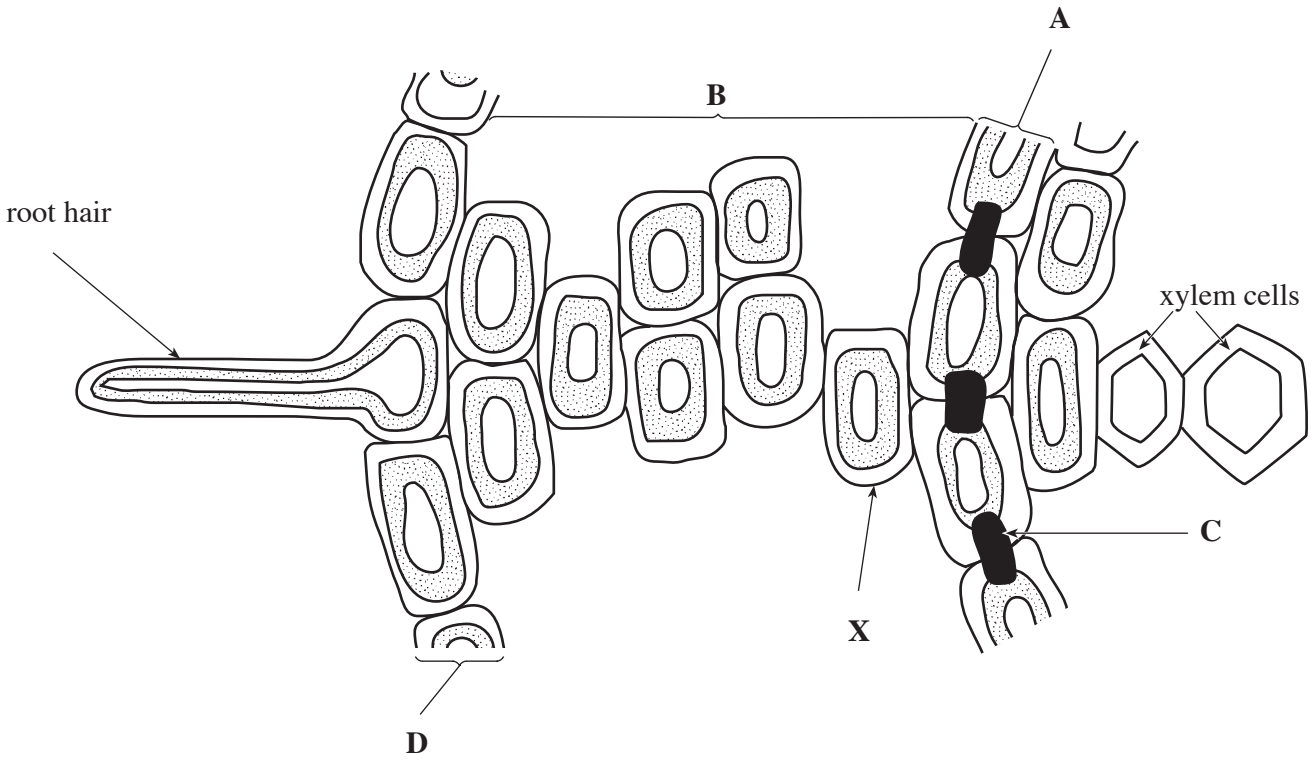
.....

.....

.....

(Total 13 marks)

5. The diagram represents part of a transverse section across a young root.



(a) Name the structures labelled [4]

A, ...

B, ...

C, ...

D. .....

(b) (i) The ion concentration in the root hair is greater than in the soil water. Explain this difference. [1]

.....

.....

(ii) Name and describe the **two** main pathways by which ions move across **B**. [4]

.....

.....

.....

(c) (i) The concentration of ions in the cell labelled **X** was found to be 80 mmol dm^{-3} and in the soil water surrounding the root it was 0.16 mmol dm^{-3}. By how many times had the concentration increased? [1]

.....

(ii) Why are increases in ion concentration across region **B** important to the functioning of the plant? [2]

.....

.....

(iii) Structure **C** contains the water-proof substance suberin.
What effect does this have on the movement of solutions into the root? [1]

.....

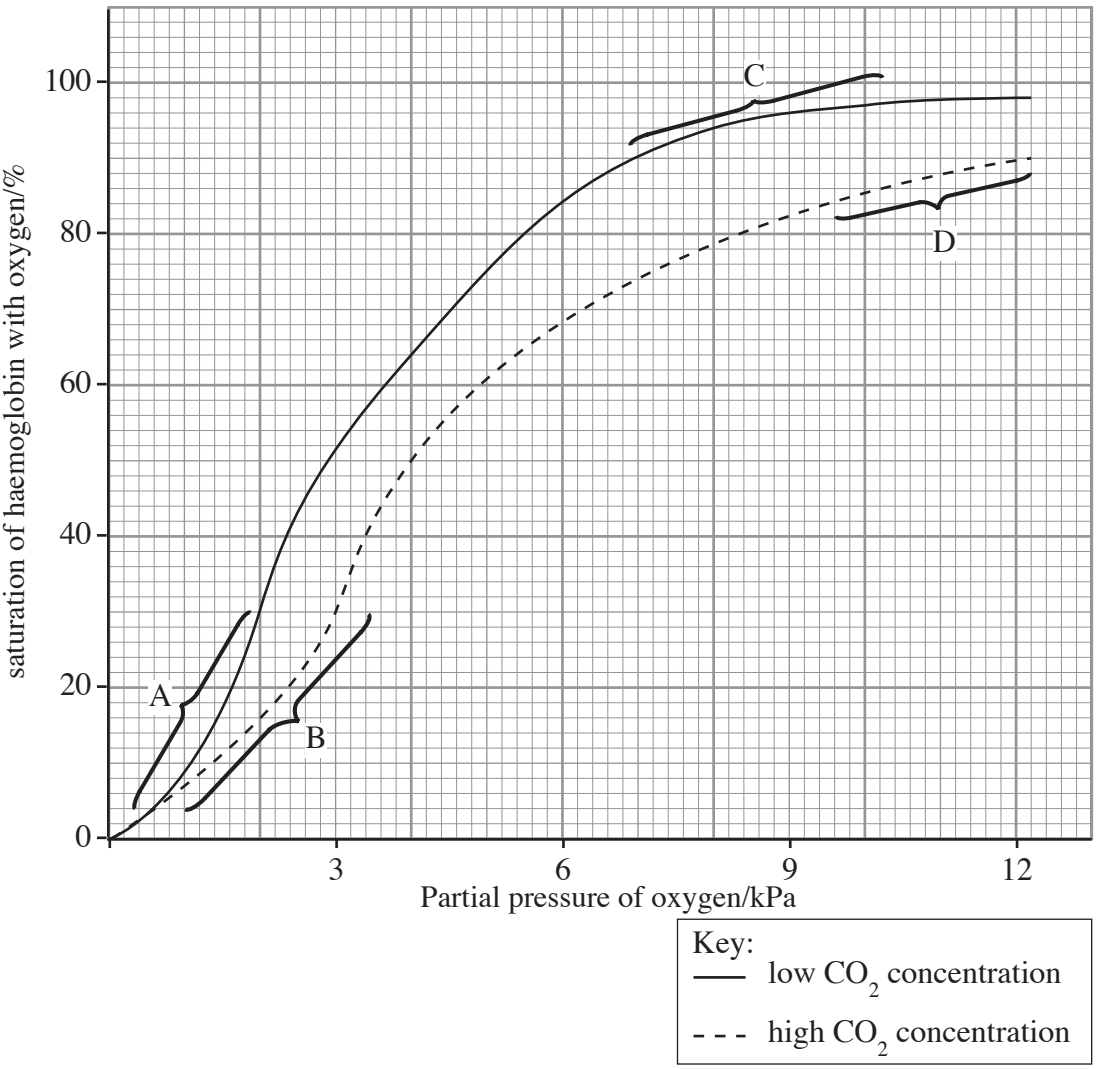
(iv) What is the importance of this effect? [2]

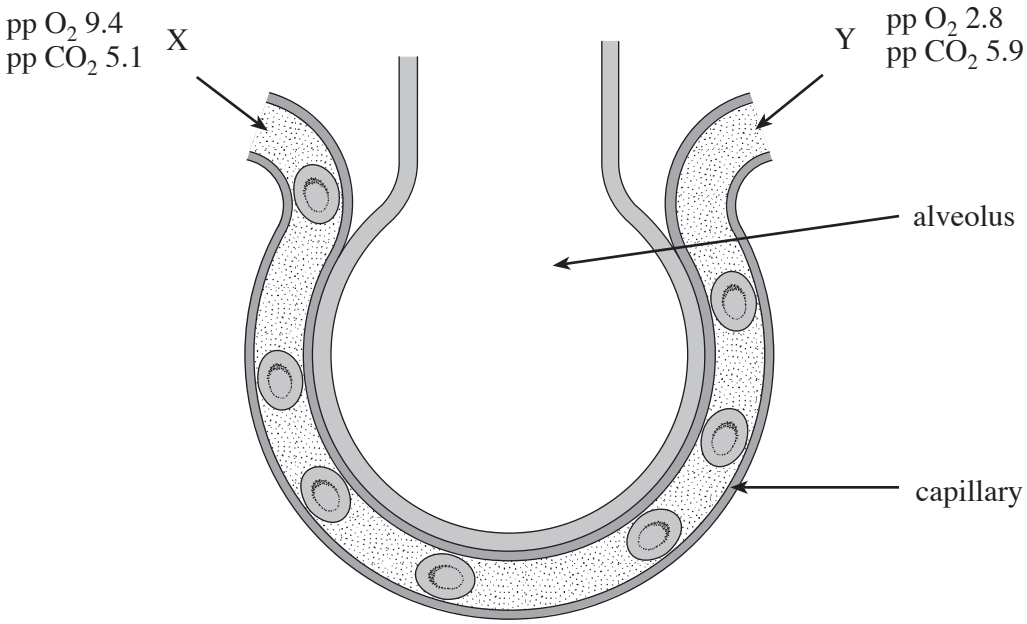
.....

.....

(Total 15 marks)

6. The graph below shows the oxygen dissociation curve for human haemoglobin at two carbon dioxide concentrations.
The diagram below represents an alveolus and its blood supply. The numbers indicate the partial pressures of oxygen and carbon dioxide in regions X and Y.





(a) Which of the four regions on the dissociation curve (A, B, C or D) represents the point at which

(i) the blood in region **X** of the capillary is in contact with the alveolus; [1]

.....

(ii) the blood in region **Y** of the capillary is in contact with the alveolus. [1]

.....

(b) Explain the importance of

(i) the effect of carbon dioxide on the dissociation curve; [1]

.....

(ii) the steep gradient of the curve between A and C. [1]

.....

(c) Name the process by which gases are exchanged across the alveolus wall. [1]

.....

(d) The capillary regions X and Y represent the smallest divisions of two major blood vessels. Name the major blood vessel in each case and explain your choice.

X ..... [1]

Explanation .....

..... [1]

Y ..... [1]

Explanation .....

..... [1]

(e) (i) On the graph, draw a curve for fetal haemoglobin. [2]

(ii) Explain the position you have chosen for your drawing. [2]

.....

.....

(Total 13 marks)

7. Answer **one** of the following questions.

Any diagrams included in your answer must be fully annotated.

Either, *(a)* As the last ice age ended, much of Wales was exposed as bare rock.

(i) Use the terms *community* and *succession* to suggest how the land would have changed in the following few thousand years. [7]

(ii) Explain how human activity has affected the natural succession of plants and animals. [3]

Or, *(b)* Discuss the main ways in which different animals are adapted to exchange respiratory gases. [10]

Examiner only

(Total 10 Marks)

Examiner only